APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/846,297	05/02/2001	Kiyoshi Kumata	0717-0465P	3865

			EXAMINER
2292	7590	07/14/2004	NGUYEN, CHANH DUY

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ART UNIT	PAPER NUMBER
2675	23

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO 90C (Rev 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/846,297	KUMATA ET AL
	Examiner	Art Unit
	Chanh Nguyen	2675

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 April 2004*.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: _____.

DETAILED ACTION

1.   The reply under 37 C.F.R. § 1.111 has been entered and considered by

examiner.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

3.   This application currently names joint inventors. In considering patentability of

the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g)

prior art under 35 U.S.C. 103(a).

4.   Claims 1-4 and 7-11 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Zimmermann (U.S. Patent No. 5,185,667) in view of Nayar (U.S. Patent No.

5,760,826) and further in view of Juday et al (U.S. Patent 5,067,019; hereinafter briefly

referred to as Juday).

As to claim 1, Zimmermann discloses an omniazimuthal visual system including an optical system (1-2) capable of instantaneously obtaining an image of at least 180^0 view field area therearound and capable of central projection transformation for acquiring the image; see column 4, lines 49-59. Zimmermann teaches an image section (3) for converting the image obtained through the optical system into the image data (see column 3, lines 29-32). Zimmermann teaches that a computer (5-7) including an image transformation (6-7), a display section (display monitor 11) and a display controller (8-10, 12) as recited in the claim; see column 3, lines 25-48.

It is noted that the optical system recited in the claim is well-known in the art to receive an image of 360^0 view field area (panoramic 360^0 image) being central projection transformation for acquiring the image (i.e. polar coordinate transformed to rectangular coordinate, even suggested by Zimmerman (i.e. the first property of a fish eye lens is that the lens has a 2π steradian field of view and the image it produces is a circle); see column 5,lines 13-15. It is noted that 2π steradian field of view is equal to 360^0 field of view . Moreover, examiner cites well-known feature an omniazimuthal visual system including an optical system (1-2) capable of instantaneously obtaining an image of 360^0 view field area taught by Nayar. Nayar teaches back to back paraboloid-shaped reflector (i.e. hemispherical scene 730 and hemispherical scene 130) so that together they constitute a spherical scene ; see column 9, lines 33-44. Therefore, it would have been obvious to one of ordinary skill in the art at the invention was made to have substituted optical system of Nayar to the optical system of Zimmerman so that the spherical scene or an image of 360^0 view field area can be obtained.

The only thing different between Zimmerman, Nayar and the claimed invention is that the image transformation section (6-7) of the Zimmermann uses software similar to the related art (Figure 10) of the application to perform the transforming the image data into display data whereas the claimed invention uses hardware such as a buffer memory, an arithmetic/logic circuit, a lookup table and a CPU to perform the transforming the image data.

Juday teaches at least one buffer memory (50, 74, 24, 46) for temporarily storing the image data and the display data , an arithmetic/logic circuit (multiplier 30, 68, adder 42, 72) for performing coordinate transformed into display data , a lookup table of trigonometric function (34, 36) for use in the arithmetic/logic circuit (30, 68, 42, 72), CPU (computer 104) for controlling at least one buffer memory, the arithmetic/logic circuit and the table. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted the hardware image transformation as taught by Juday to the software image transformation section of Zimmerman as modified by Nayar so as to provide a real time remapped image according to any one of a number of different remapping transformations; see column 3, lines 20-46 of Juday.

As to claims 2-3, Juday clearly teaches the transform image data including zoom function (magnification) or pan function for generating a perspective image; see column 14, line 40 through column 15, line 51.

As to claim 4, Juday clearly teaches the arithmetic/logic circuit is being formed only by linear operation circuit (adding or mutiplier circuits is linear operation circuit); see column 9, line 18-34 (it is noted that the equation (3) is linear equation).

As to claim 7, transforming the image into digital image data is taught by Zimmermann (see column 3,lines 28-31), even the reference of Juday teaches an analog to digital converter (6).

As to claim 8, the image section (programmable remapper 10) of Juday having expansion PROM (e.g., 142) for storing the image information. This reads on the an image recording section as broad claimed language.

As to claim 9, Juday teaches that "the Address Lookup Table 34 (and the Factor Look-Up Table 36) may be segmented to allow several transforms to be loaded at once; see column 7, lines 51-60. Thus the CPU (104) must process in parallel so that several transform can be loaded at once.

As to claims 10-11, the limitations recited in claims 10-11 are met by Zimmermman (see column 5, lines 20-46) and the prior art by Juday. For example, Juday clearly teaches a pan function.

5.   Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmerman and Nayar in view of Juday as applied to claim1 above, and further in view of Nobutoshi (JP 06-295333).

As to claims 5, note the discussion of Zimmerman, Nayar and Juday above, Nobutoshi further teaches the optical system including a hyperboloidal mirror having a

hyperboloidal shape of one sheet of a two sheeted hyperboloid (see constitution and

see paragraph 0020). Nobutoshi teaches a rotation axis of the hyperboloidal mirror

being identical with an optical axis of an imaging lens included in the imaging section

and a first principal point of the imaging lens being located at a focal point of the

hyperboloidal mirror (see figure 1 and see paragraphs 0019-0028). Therefore, it would

have been obvious to one of ordinary skill in the art at the invention was made to have

used a hyperboloidal mirror having a hyperboloidal shape of one sheet of a two sheeted

hyperboloid as taught by Nobutoshi so as to reduce distorted picture (see paragraph

01250).

As to claim 6, Nobutoshi clearly teaches first and second mirrors as recited in the

claim (see Figure 2 and Figure 7).

Response to Arguments

6.   Applicant's arguments filed April 30, 2004 have been fully considered but they

are not persuasive.

As to rejection -35.U.S.C. 103; Zimmermann, Nayar and Juday, on page 3, last

paragraph, applicant argues that Juday, as well as the combination of Zimmermann,

Nayar and Juday, fails to teach or suggest at least a look-up tables of a trigonometric

function in the context claimed. Examiner totally disagrees with applicant this point of

view because a look-up tables of a trigonometric function is clearly taught by Juday.

Applicant agrees that "the claimed look-up tables of a trigonometric function provides

the function of sine, cosine or tangent, etc, for a given input data" (see Remark, page 3,

lines 1-3). After carefully review the reference of Juday, Examiner would like to present

his point of view as follows:

On column 18, lines 53-65, Juday recites that "one of said <u>look-up table sets</u>

includes <u>transformation means for transforming an input image</u>, a portion of which is

masked by a scotoma area, <u>to an output image</u> such that said input image <u>is warped</u>

about a corresponding area on said output image...". On column 12, line 43 through

column 13, line 47 as well as column 14, lines 1-39, Juday clearly performs

transformation from an input image to output image by using sine, cosine and tangent .

That is remapping from the x, y coordinates of an input matrix to a u, v output matrix

where the x<u>, v coordinates are warped</u> or stretch by the sin, cosine and tangent

transformation function in relation of α, β (see equations 4-5 in column 12, equation 7

in column 13 and equations in column 14). Thus, taking into consideration teaching

above in the reference of Juday as a whole, Juday clearly teach the look-up tables (34

and 36) as a look-up tables of a trigonometric function since they perform the functions

of sine, cosine or tangent.

On page 4, last paragraph to page 5, applicant argues that "even if one of

ordinary skill in the art were to consider the combination of Zimmermann, Nayar and

Juday, the combination would render Zimmerman for its intended purpose, and thereby

teaches away from the combination" (i.e. Zimmermann involves non-linear functions for

mapping UV object space and the XY image space while Juday teaches the system for

mapping image space to transformed image space). Examiner disagrees with applicant

the assertion "teach away from the combination" between Zimmermann and Juday because both Zimmermann and Juday use camera to capture image and transform it into the image data.

On page 6, applicant argues that "applying Juday's transformation system to Zimmermann would only serve to substantially deviate from its capability from transforming images obtained from a fisheye lens in real time. Examiner disagrees with applicant this point of view since adding the circuitry of Juday to the device of Zimmermann does not deviate from the capability from transforming images obtained from a fisheye lens in real time, but the combination would accommodate from certain defects of visually-impaired people by transforming an input image into a warped output image in a real time (see column 4, lines 4-7 of and column 3, lines 20-46 Juday).

Conclusion

7.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Inquiries

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Chanh Nguyen whose telephone number is (703) 308-

6603.

Any inquiry of a general nature or relating to the status of this application or

proceeding should be directed to the Technology Center 2600 Customer Service Office

whose telephone number is 9703) 306-0377.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231
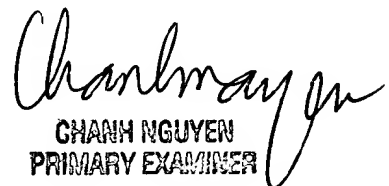
or faxed to:

(703) 872-9306

Hand-delivered responses should be *rought to Crystal Park II, 2121 Crystal

Drive, Arlington, VA, Sixth Floor (Receptionist)

C.Nguyen

July 10, 2004

CHANH NGUYEN
PRIMARY EXAMINER